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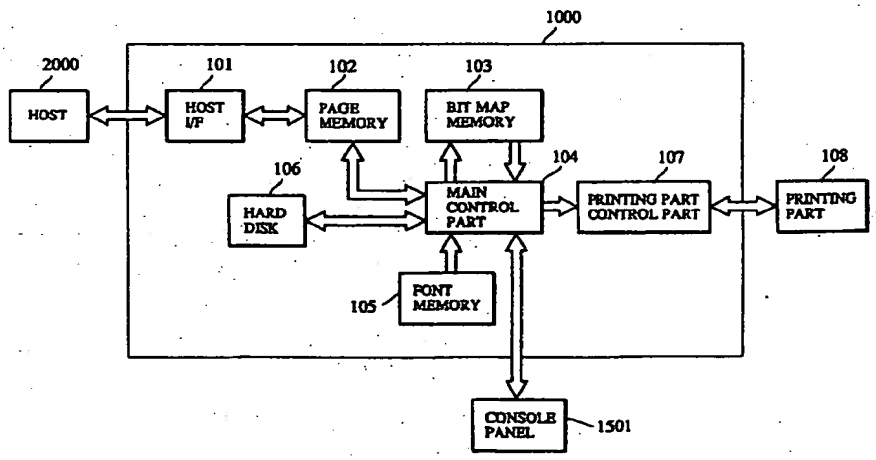
(54) Apparatus and method for printing confidential data.

(57) The present invention provides a technique which can protect security of data until a regular user who transmits print data directs to start printing on the side of a printing apparatus even in an environment where a plurality of host computers on a network use a common printing apparatus, and which can print image data which has already been produced, as it is after the user gives instructions to start printing.

FIG. 4



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BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a printing apparatus and a printing method in which text data is received from host computers on a network and then printed.

Description of the Related Art

In a conventional system employing a network, when electronic mail data is received, a password is invariably verified. Since only the user licensed to see data can access data requiring security protection, this system is excellent for security protection of data.

On the other hand, when it is assumed that the above data is to be printed, a printer shared by a number of users is frequently used. In this case, even if the process of verifying a password is performed, when the operator who directs output of the data is not present at the printer station, the print output of the data requiring security is delivered onto a delivery tray or delivery base, thereby creating a condition where a third person can easily see the data.

Such a system thus has the potential problem of the output print itself being delivered from the printer even if the process for security protection of data is performed, as described above.

In order to avoid the possibility that output data can be seen by an unauthorized person, it is considered that a common printer not be used, and that a personal printer be dedicated for receipt of secure data. However, this has not only the problem of compelling a great economic load but also the problem of occupying a limited space.

There is also the problem that when the data requiring security is output, the operator who gives directions to output the data must always move to the location where the printer is installed, and is thus has a heavier workload.

In the typical example, since the transmitted text data is output immediately after being received by a printing apparatus, there is further the problem that text data which must not be seen by other users cannot be output, particularly, in those cases where the user is at a distance from the printing apparatus.

SUMMARY OF THE INVENTION

The present invention has been achieved for solving the above problems. It is an object of the present invention to provide a printing apparatus in which the start of output by the printer engine, the output order and a face-down option are controlled based on the received document data on which a decision is made as to whether data for correlation and verification is added, so that it is possible to prevent the document data requiring security protection from being freely printed, efficiently print subsequent document data without hindrance, and output the data face-down.

It is another object of the present invention to provide a printing apparatus in which an output destination of the image data produced in accordance with output limiting data contained in the received print data is controlled so that the instructions to start output of the print data transmitted from a host computer can be entrusted to the regular user alone on the side of the printing apparatus, thereby performing print processing with high security.

One aspect of the present invention comprises decision means for deciding whether or not predetermined data for correlation and verification is added to the received document data, demand means for causing an operating display to demand the input of predetermined correlation data when the decision means detects that predetermined data for comparison, transfer means for transferring, to a host device, the correlation data input from the operating display in accordance with the demand from the demand means, and control means for controlling the start of printing of the document data on the basis of the correlation result obtained from the host device for the correlation data transferred from the transfer means.

Another aspect of the present invention comprises control means for controlling the transfer order of the produced image data so that when the decision means decides that the predetermined data for correlation and verification is not added to the text data subsequently received, the image data produced on the basis of the text data subsequently received is preferentially output to a printer engine.

In still another aspect of the present invention control means is provided for controlling face-up or face-down output on the printing surface of a recording medium on the basis of the decision result obtained from decision means.

Yet another aspect of the present invention comprises production means for producing image data on the basis of the print data received from any one of host computers, external storage means for storing the image data output from the production means, a printer engine for printing on the basis of the image data, and switching means for switching the external storage means and the printer engine as a destination of transfer of the image data produced on the basis of output limiting data contained in the print data.

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In still another aspect of the present invention there comprises storage means for storing user data for identifying the user, input means for inputting predetermined data, correlation means for correlating the user data stored in the storing means with the data input from the input means, and control means for controlling the start of transmission of image data to a printer engine from the external storage means on the basis of the correlation result obtained from the correlation means.

These and other objects will become apparent in view of the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a sectional view illustrating the construction of a first output apparatus to which the present invention can be applied;

Fig. 2 is a perspective view illustrating the construction of a second output apparatus to which the present invention can be applied;

Fig. 3 is a block diagram illustrating the configuration for control of the second output apparatus shown in Fig. 2;

Fig. 4 is a block diagram illustrating the configuration for control of a printing apparatus in accordance with an embodiment of the present invention;

Figs. 5(a) and 5(b) are drawings illustrating the data structure of the text data received by the printing apparatus shown in Fig. 4 from an external device, and the structure of password correlation request data;

Figs. 6(a) and 6(b) are drawings illustrating a message displayed on a screen of the operating part shown in Fig. 5;

Fig. 7 is a flowchart illustrating an example of the procedure for controlling password printing in a printing apparatus in accordance with the present invention;

Figs. 8(a) and 8(b) are flowcharts illustrating an example of the procedure for controlling password printing in a printing apparatus in accordance with the present invention;

Fig. 9 is a flowchart illustrating an example of the procedure for controlling password printing in a printing apparatus in accordance with the present invention;

Fig. 10 is a block diagram illustrating the configuration for control of a printing apparatus in accordance with another embodiment of the present invention;

Fig. 11 is a flowchart illustrating an example of the procedure for controlling security output in a printing apparatus in accordance with the present invention;

Fig. 12 is a block diagram illustrating the configuration for control of a printing apparatus in accordance with a further embodiment of the present invention; and

Fig. 13 is a block diagram illustrating the configuration for control of a printing apparatus in accordance with a still further embodiment of the present invention;

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Before an embodiment of the present invention is described, a laser beam printer and an ink jet printer which are suitable for applying the present invention are described with reference to Figs. 1 to 3. The printer used in the embodiment is not limited to the laser beam printer or the ink jet printer, and other types of printers may be used.

Fig. 1 is a sectional view illustrating the construction of a first printing apparatus, for example, a laser means printer (LBP), to which the present invention can be applied.

In Fig. 1, reference numeral 1500 denotes a LBP for inputting and storing print data (character code, etc.), form data, macro instructions and so on, which are supplied from an external host computer connected thereto, forming a character pattern or form pattern corresponding to the above data, and forming an image on a recording sheet as a recording medium. Reference numeral 1501 denotes a console panel on which operating switches and LED displays are disposed, and reference numeral 1000 denotes a printer control unit for controlling the LBP 1500 and analyzing character data supplied from the host computer. The printer control unit 1000 converts character data into a video signal comprising a corresponding character pattern and outputs the signal to a laser driver 1502. The laser driver 1502 is a circuit for driving a semiconductor laser 1503 by turning-on and off of a laser beam 1504 emitted from the semiconductor laser 1503 in accordance with the video signal input thereto. The laser beam 1504 is laterally deflected by a rotating polygon mirror 1505 for scanning exposure of an electrostatic drum 1506. This forms an electrostatic latent image of a character pattern on the electrostatic drum 1506. This latent image is developed by a development unit 1507 disposed around the electrostatic drum 1506, and then transferred to the recording sheet. A cut sheet is used as the recording sheet, and the cut sheet recording paper is contained in a paper cassette 1508 mounted on the LBP 1500, introduced into the apparatus by a feed roller 1509 and conveyance rollers 1510 and 1511, and then supplied to the electrostatic drum 1506. The LBP 1500 is provided with at least one card slot (not shown) so that in addition to the contained fonts, an option font card and a control card (emulation card)

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having a different language system can be connected to the LBP 1500.

Fig. 2 is a perspective drawing illustrating the construction of a second printing apparatus, for example, an ink jet recording apparatus (IJRA), to which the present invention can be applied.

In Fig. 2, a lead screw 5005 is rotated through driving force transmitting gears 5011 and 5009 in linkage with the normal and reverse rotations of a driving motor 5013, and a carriage HC which engages a helical groove 5004 of the lead screw 5005 has a pin (not shown) so as to be reciprocated in directions of arrows a and b. An ink jet cartridge IJC is mounted on the carriage HC. Reference numeral 5002 denotes a paper presser plate for pressing paper on platen 5000 in the direction of movement of the carriage. Reference numerals 5007 and 5008 each denote a photocoupler serving as home position detection means for confirming the presence of a lever 5006 of the carriage HC within the region of the home position and signaling to switch the direction of rotation of a motor 5013. Reference numeral 5016 denotes a member for directing a capping member to cap the whole surface of a recording head, and reference numeral 5015 denotes suction means for sucking the contents in the cap for suction recovery of the recording head through an opening 5022 in the cap. Reference numeral 5017 denotes a cleaning plate which can be moved forwardly and backwardly by a member 5019. Reference numeral 5018 denotes a body supporting plate for supporting the cleaning plate 5017 and the member 5019. Reference numeral 5021 is a lever which is moved with the movement of a cam 5020 engaging the carriage HC so as to start the suction for suction recovery, the movement being controlled by switching known transmission means such as a clutch or the like for transmitting the driving force from the driving motor 5013.

The capping, cleaning and suction recovery operations are set to perform desired processing at the corresponding positions by the operation of the lead screw 5005 when the carriage HC is within the home position region. However, these operations may be set to perform the desired processing in known timing.

Fig. 3 is a block diagram illustrating the configuration for control of the printing apparatus shown in Fig. 2.

In Fig. 3, reference numeral 1700 denotes an interface for inputting record signals, reference numeral 1701, MPU; reference numeral 1702, ROM for storing a control program executed by the MPU 1701; and reference numeral 1703, DRAM for storing various items of data (the record signals, record signals to be supplied to a head and so on) . Reference numeral 1704 denotes a gate array for controlling the supply of output data to a recording head 1708 and controlling the transfer of data between the interface 1700, the MPU 1701 and the DRAM 1703. Reference numeral 1710 denotes a carrier motor for conveying the recording head 1708; reference numeral 1709, a conveyance motor for conveying recording paper; reference numeral 1705, a head driver for driving the recording head; reference numeral 1706, a motor driver for driving the conveyance motor 1709; and reference numeral 1707, a motor driver for driving the carrier motor 1710.

In the printing apparatus constructed as described above, when data is input from a host computer, which will be described below, through interface 1700, the input data is converted into output data between gate array 1704 and MPU 1701. The motor drivers 1706 and 1707 are then driven, and the recording head is driven to print an image in accordance with the output data supplied to the head driver 1705.

Fig. 4 is a block diagram illustrating the construction of a controller for control of a printing apparatus in accordance with a first embodiment of the present invention. The block diagram of the first embodiment shown in Fig. 4 is described in detail below with reference to Fig. 1 showing a laser beam printer.

In Fig. 4, reference numeral 1000 denotes a printer control unit comprising a host I/F 101, a page memory 102, a bit map memory 103, a main control part 104, a font memory 105, a hard disk 106, and a printing part controlling part 107, which will be described below. Reference numeral 108 denotes a printing part (printer engine part), and reference numeral 1501 denotes a console panel serving as an operating part. Although the printer engine part 108 employs an electrophotographic method for printing, the use of the ink jet method shown in Fig. 2 causes no interference with application of the present invention and may be substituted.

In the printing apparatus described above, when a demand for inputting predetermined correlation data is given to the operating part 1501 on the basis of the decision result obtained from the main control part 104 comprising CPU, RAM used as a work memory and ROM for storing a program, which are not shown in Fig. 4, the correlation data input from the operating part 1501 in accordance with the demand is transmitted to the host computer 2000, and the main control part 104 controls the start of printing of text data on the basis of the correlation result which is obtained from the host computer 2000 for the transmitted correlation data. When text data with the correlation verification data is received, the main control part 104 controls printing so as to positively prevent the data from

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being freely printed until it is decided on the side of the host computer 2000 that the user giving instructions to transmit the information inputs suitable correlation data from the printing apparatus receiving the text data.

When it is decided that the predetermined correlation verification data is not added to the text data subsequently received in accordance with the flowcharts shown in Figs. 7, 8 and 9, which will be described below, the main control part 104 controls the order of transfer of the produced image data so that the image data produced on the basis of the text data subsequently received is preferentially output to the printer engine part 108. When text data having no need for correlation is successively received from the host computers 2000, the text data is printed in preference to text data requiring correlation, without establishing the printing standby state. The control programs shown in the flowcharts in Figs. 7, 8 and 9 are stored in the ROM (not shown) of the main control part 104.

The main control part 104 controls face-up or face-down output with respect to the printing surface of the recording medium on the basis of the decision result. When text data requiring correlation is printed, the recording paper is always delivered in the face-down state.

Specifically, the text data transmitted from an external device is sent to the page memory 102 (comprising RAM) through the host I/F 101. When data for at least one page is stored in the page memory 102, the CPU of the main control part 104 successively reads data from the page memory 102, converts the data into dot data by referring to the font memory 105 and develops the dot data in the bit map memory 103. When the dot data for one page is completely developed in the bit map memory 103, the CPU of the main control part 104 successively reads the dot data from the bit map memory 103 and transmits the data to the printing part controlling part 107.

The printing part controlling part 107 converts the dot data into serial data synchronously with the horizontal or vertical synchronous signal output from the printing part 108, and transmits the data to the printing part 108 to print the data.

A description will now be made of the operation when text data requiring verification of a password with reference to Figs. 5, 6, 7, 8 and 9.

Fig. 5 is a drawing illustrating the data structure of the text data received by the printing apparatus shown in Fig. 4 from the host computer 2000, and the structure of password correlation request data. Fig. 5(a) shows received data and Fig. 5(b) shows transmit data.

Fig. 6 is a drawing illustrating messages displayed on a LED display screen of the operating part 1501.

Fig. 7 to 9 are flowcharts illustrating the procedure for password printing control of a printing apparatus in accordance with the present invention. Numerals (1) to (19) each indicate a step.

Text data having the structure shown in Fig. 5-(a) is transmitted from the host computer 2000. The CPU decides whether or not the input text data requires verification of a password (step 1). If the data requires no verification of the password, printing is immediately started (step 8). While if the text data requires the verification of the password, the need to verify the password is displayed on the operating part 1501, as shown in Fig. 6(a) (Step 2).

The input text data is converted into dot data, and then developed in the bit map memory 103 by the CPU, whether or not the password has been input (step 3).

If the password is input from the operating part 1501 (Step 4), the host computer 2000 is directed in the data form shown in Figs. 5(b) to verify the password through the host I/F 101 in step 5. If data indicating that the input password is correct is input from the host computer 2000 (Step 6), the flow advances to step 13, and printing is started.

During printing, even in a printing apparatus which can output the delivered sheet in the face-up state, printing is inevitably performed in the face-down state, i.e., in the state where the print surface is turned down. This is because the security of the text data requiring the password must be protected as much as possible.

Next, the flow advances to Step 13 in which the CPU makes a decision as to whether or not the text data to be printed will be stored in hard disk 106. If no, the process proceeds to Step 15. If yes, the text to be printed is read and develop read data in bit map memory 103 (Step 14), and the process proceeds to Step 14.

When the face-up state is specified for output of the printing apparatus in step 15, the CPU displays, on the operating part 1501, the message for making sure the face-up state is OK (step 16) . After the operator makes a decision in steps 17 and 18, the printing work is started in step 19 on the basis of the result of decision by the operator.

When a message indicating that the password input from the operating part 1505 is wrong is input from the host computer 2000 in step 7, the flow advances to step 9 for demanding the operator to input a password again, and the flow then returns to step 4. When text data of a next user is input from, for example, another host computer, in step 4, the flow advances to step 10. If the text data is input, the flow advances to step 11 in which the text data of the present user present in the bit map memory 103 and the page memory 102 is stored in the hard disk 106 to be saved, and the text data of the next user is input. The hard disk 106 may be

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detachable from the printing apparatus.

When the next user also decides in step 12 that verification of a password is required, the flow returns to step 2 for displaying the message shown in Fig. 6(b) on the operating part 1501 and demanding the verification of the password.

In this case, both the user name and the password must be input and verified, and the text data of the user for which the verification is completed is printed.

If the text data is stored in the hard disk 106, the text is read from the hard disk 106 and then printed.

When the input text data does not require the verification of a password, the flow advances to step 13 in which the CPU makes a decision as to whether or not the text data to be printed is stored in the hard disk (HD) 106. If the decision is NO, the flow advances to step 15. If the decision is YES, processing in steps 14 to 19 is executed, and the printing work is started. In this embodiment, the operating part 1501 may comprise a terminal or the like.

Although this embodiment comprises the hard disk 106 for storing the bit map data, other embodiments may comprise another storage device such as a flash memory, DRAM or the like.

Although, in this embodiment, the password is verified by the host computer 2000, a password may be contained in text data so that the password can be verified on the printer side.

The present invention can be applied to both a system comprising a plurality of apparatus and a system comprising a single apparatus. The present invention can also be applied when the invention is achieved by supplying a program to a system or an apparatus.

As described above, in accordance with the first embodiment of the present invention, the operating display demands input of predetermined correlation data on the basis of a decision by the decision means, the correlation data input at the operating display is transmitted to a host device by the transfer means, and the start of printing of the text data is controlled by the control means on the basis of the result obtained from the host device for the transferred correlation data so that when text data having correlation verification data is received, it is possible to securely prevent the data from being freely printed until the host side decides that the user giving instruction to transmit the data has input suitable correlation data from the printing apparatus which receives the text data.

In accordance with the second embodiment, when the decision means decides that the text data subsequently received does not have the predetermined correlation verification data, the control means controls the transfer order of the produced image data so that the image data produced on the basis of the text data subsequently received is preferentially output to the printer engine. When text data having no need for correlation is successively received from the host devices, the printing apparatus is not in the standby state, and the text data without the need for correlation can be printed in preference to text data requiring correlation.

In accordance with a third embodiment, the control means controls the face-up or face-down output on the printing surface of a recording medium on the basis of the decision by the decision means so that when text data requiring correlation is printed, the recording sheet can inevitably delivered in the face-down state.

Document data requiring security protection is thus securely prevented from being freely printed. It is also possible to efficiently print subsequent document data without hindrance, and output data in the face-down state.

Fig. 10 is a block diagram illustrating the configuration for control of a printing apparatus in accordance with a second embodiment of the present invention. The block diagram of the second embodiment shown in Fig. 10 is described in detail below with reference to the laser beam printer shown in Fig. 1.

In Fig. 10, reference numerals 1102-1 to 1102-N each denote a host computer, reference numeral 115 denotes a user who is operating one of the host computers 1102-1 to 11-2-N, and reference numeral 1103 denotes a network to which the host computers including the printing apparatus 1500, are connected.

A printer control unit 1000 comprises an interface 404 for inputting text data from the network 1103, a main control part 405 comprising a CPU (not shown) and a program ROM, a code ROM 406, a font ROM 407 for storing fonts, a RAM 408 used for operating the main control part 405, a hard disk (HD) 409, a CPU bus 414 for transmitting data between the main control part 405 and each of the electric devices, and an engine interface 412 for mediating data transmission between the CPU bus 414 and the printing engine 413. Reference numeral 1501 denotes a console panel comprising a display panel 410 for transmitting data to the user, and a key panel for transmitting data to the printing apparatus from the user. Reference numeral 413 denotes the printing part (printer engine) for executing printing. In the printing apparatus configured as described above, the main control part 405 switches the destination of the produced image data to the HD 409 or the printer engine 413 on the basis of the output limiting data contained in print data so as to prevent the produced image data from disappearing or being unconditionally output even when the print data is received from

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the host computer to produce the image data.

Further, since the main control part 405 correlates the user data stored in the RAM 408 or the HD 409 with the password input from the key panel 411 and controls the start of transfer of the image data to the printer engine 413 from the HD 409 on the basis of the correlation result, it is possible to securely prevent printing of the stored image data until the regular user inputs, on the printer side, data indicating the start of output of the stored data which has already been produced and not output.

The operation of controlling security output of a printing apparatus in accordance with the present invention is described below with reference to the flowchart shown in Fig. 11.

Fig. 11 is a flowchart illustrating an example of the procedure for controlling security output of the printing apparatus in accordance with the present invention. In Fig. 11, numbers (21) to (31) each denote a step.

When the CPU receives text data from the host computer 1102 in step 21, a control code for indicating that the text data is a secret document, the user name and the password are added to the top of the text data.

The CPU makes a decision in step 22 as to whether or not the control code is added. When text data without the control code is received, the CPU performs processing by the same method as that in a conventional example in step 23.

When it is decided in step 22 that the control code has been added, the CPU analyzes the received text data in step 24, and develops the data into bit image data with reference to the font data contained in the font ROM 407 in step 25. The CPU then successively stores the developed bit image data in the RAM 408 or the HD 409 in step 26.

After it is decided in step 27 that all text data is completely developed into a bit image, the CPU displays the user name on the display panel 410 and waits for the input of the password from the key panel 411 in step 28.

In this state, however, text data can be received from any one of the personal computers 1102-1 to 1102-N connected to the network 403.

The CPU decides in step 29 whether or not the correct password has been input from the key panel 411. When it is decided that the correct password has been input from the key panel 411, the CPU outputs the whole data corresponding to the input password to the printing part 413 in step 30, as described below. When it is decided that the correct password is not input from the key panel 411, the CPU displays on the display panel 410 in step 31 that the password is wrong, and processing is terminated. At this time, the control processing below may be executed.

Namely, after a predetermined time has passed since a password error notice is displayed on the display panel, the process of printing image data received with priority to security protection is abandoned, and the received data is held in a locked state in the hard disk (HD) 409 together with the received password data (user name and password). The image data may be reproduced when lock release data and the password are input so that the load of retransfer of the same data is decreased, and data security can be protected.

The normal printing sequence is then started, and the printing operation by the printing part 413 is effected by communication with the printing part 413 through the engine interface 412. After the printing operation is completely prepared, the printing part 413 then starts to print in accordance with the image signal transmitted from the engine interface 412 while transmitting a horizontal synchronous signal to the engine interface 412. The engine interface 412 reads the bit image data from the HD 409 and transmits the image signal to the printing part 412 synchronously with the horizontal synchronous signal.

As described above, when the password is input by the user, the text data is printed out completely.

In a third embodiment, a magnetic card is read by a magnetic card reading part of the printing apparatus in place of an input of the password to the printing apparatus by the user. In other words, the user name inherent to each user is converted into magnetic intensity and previously recorded on the surface of the magnetic card, and is read by the main control part so that printing is started when the user name matches the user ID.

Fig. 12 is a block diagram illustrating the control configuration of a printing apparatus in accordance with the third embodiment of the present invention.

In Fig. 12, reference numeral 1500 denotes a body of a printing apparatus; reference numeral 215, a user operating one of host computers 1202-1 to 1202-N, and reference numeral 203, a network to which a plurality of personal computers and the printing apparatus 1500 are connected.

In the printing apparatus 1500, the printer control unit 1000 comprises an input interface 204 for inputting text data from the network 203, a main control part 205 comprising a CPU and a program ROM, a code ROM 206, a font ROM 207 for storing fonts, a RAM 208 used for operating the main control part 205, a hard disk (HD) 209, a CPU bus 214 for transmitting data between the main control part 205 and each electrical device, an engine interface 212 for mediating data transmission between a CPU bus 214 and the printing part (ENGINE) 213, and a magnetic card interface 217

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for transmitting the data read by a magnetic card reading part 216 to the CPU bus 214. Reference numeral 1501 denotes a console panel comprising a display panel 210 for transmitting data to the user, and a key panel 211 for transmitting data to the printing apparatus from the user.

The operation of this embodiment is now described. The user 215 operates the host computer 1202 to transmit text data to the printing apparatus 1500 from the host computer 1202. At the same time, a control code indicating that the text data is a secret document, and identifying the user name and the password are added to the top of the text data. When text data without the control code is received, the main control part 205 performs processing by the same method as that in the conventional example.

The CPU analyzes the text data and develops the data into bit image data with reference to the font data contained in the font ROM 207. The developed bit image data is successively stored in the RAM 208 or the HD 209. After the all text data is completely developed, the main control part 205 displays the user name on the display panel 210, and waits for input of the password of the user name by the magnetic card.

However, in this state, text data can be received from any one of the host computers 1202-1 to 1202-N connected to the network 203.

When the user name is verified by the magnetic card, the main control part 205 outputs data corresponding to the input user name to the printing part 213, as described below. The printing operation of the printing part 213 is first prepared by communication with the printing part 213 through the engine interface 212.

After the printing operation of the printing part 213 is completely prepared, the printing part 213 starts to print in accordance with the image signal transmitted from the engine interface 212 while transmitting a horizontal synchronous signal to the engine interface 212. The engine interface 212 reads the bit image data from the HD 209 and transmits the image signal to the printing part 213 synchronously with the horizontal synchronous signal.

As described above, the text data is completely printed out when the IC card of the user is read by the IC card reading part 216 of the printing apparatus 101.

In a fourth embodiment, a fingerprint of the user is read by the image reading part of a printing apparatus in place of input of the password to the printing apparatus by the user. Namely, the form of a fingerprint of each user is previously recorded in a fingerprint correlating part so that when a fingerprint is detected, the corresponding user name is read by the main control part. When the read user name matches the user name of the transmitted text data, printing is started.

Fig. 13 is a block diagram illustrating the configuration for control of a printing apparatus in accordance with a fourth embodiment of the present invention.

In Fig. 13, reference numeral 1500 denotes a body of a printing apparatus; reference numeral 315, the user operating one of host computers 1302-1 to 1302-N; and reference numeral 303, a network to which a plurality of personal computers including the printing apparatus 1500 are connected.

In the printing apparatus 1500, the printer control unit 1000 comprises an input interface for inputting text data from the network 303, a main control part 305 comprising a CPU and a program ROM, a code ROM 306, a font ROM 307 for storing fonts, a RAM 308 used for operating the main control part 305, a hard disk (HD) 309, a CPU bus 314 for transmitting data between the main control part 305 and each of electric devices, an engine interface 312 for mediating data transmission between the CPU bus 314 and the printing part 313, a driver 317 for driving an image reading part 318, and a fingerprint correlating part 316 for correlating the read fingerprint image and transmitting the registered user name to the CPU bus 314.

The operation of this embodiment is described below. The user 315 operates the host computer 1302 to transmit text data to the printing apparatus 1500 from the host computer 1302. At the same time, a control code indicating that the text data is a secret document, and identifying a user name and a password are added to the top of the text data. When text data without the control code is received, the main control part 305 performs processing by the same method as that in a conventional example.

The CPU analyzes the text data and develops the data into bit image data with reference to the font data stored in the font ROM 307. The developed bit image data is successively stored in the RAM 308 or the HD 309.

After all text data is completely processed, the CPU displays the user name on the display panel 310, and waits for input of the password of the user name by the fingerprint of the user 315.

In this state, however, text data can be received from any one of the host computers 1302-1 to 1302-N connected to the network 303.

In the fingerprint correlating part 316, the image read by the image reading part 318 through the driver 317 is compared with the registered fingerprint image of the user. When it is decided that both fingerprints are the same, the corresponding user name is reported. The CPU outputs the data corresponding the reported user name to the

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printing part 313, as described below.

The printing operation of the printing part 313 is first prepared by communication with the printing part 313 through the engine interface 312.

After the printing operation of the printing part 313 is completely prepared, printing is started in accordance with the image signal transmitted from the engine interface 312 while transmitting a horizontal synchronous signal to the engine interface 312. The engine interface 312 reads the bit image data from the HD 309 and transmits the image signal to the printing part 313 synchronously with the horizontal synchronous signal.

As described above, text data is completely printed out when the fingerprint of the user is read by the fingerprint reading part of the printing apparatus 301.

In each of the above embodiments, a storage medium (comprising RAM having the backup function) for holding the user name or password is provided in the printing apparatus 1500, and an operation program is stored in the ROM so that the printed image data is not printed out after the transmitted text data is developed into the print image data unless the user has input the password. It is thus possible to positively prevent the sheet printed out by an unspecified user from being seen by a third person, and to permit the transmitted print data to be immediately output by a regular user.

As described above, since switching means switches the destination of the produced image data to external storage means or the printer engine on the basis of the output limiting data contained in print data, it is possible to positively prevent the produced image data from disappearing and unconditionally output even when print data is received from a host computer to produce image data.

Alternatively, since the input data is correlated with user data stored in storage means by correlation means so that control means controls start of transmission of image data to the printer engine from the external storage means on the basis of the correlation result, it is possible to positively prevent the stored image data from being printed until data indicating the start of output of the image data which has already been produced and stored without being output is input from the regular user on the printer side.

The present invention thus has the effect that, even in an environment where a plurality of host computers on a network use a common printing apparatus, security can be maintained until the regular user who transmits print data directs to start printing on the side of the printing apparatus, and the image data which has already been produced can be printed as it is after the user gives the instructions to start printing.

While the present invention has been described with respect to what is presently considered to be the preferred embodiments, it is to be understood that the invention is not limited to the disclosed embodiments. The present invention is intended to cover various modifications and equivalent arrangements included within the spirit of the appended claims.

The present invention provides a technique which can protect security of data until a regular user who transmits print data directs to start printing on the side of a printing apparatus even in an environment where a plurality of host computers on a network use a common printing apparatus, and which can print image data which has already been produced, as it is after the user gives instructions to start printing.

Claims

1. A printing apparatus having an operating display part and a printer engine for printing image data in accordance with text data sequentially received from a plurality of host devices on a network, said printing apparatus comprising:

   decision means for deciding whether the sequentially received text data includes a requirement to input predetermined data for correlation and verification;

   demand means for causing the operating display to demand an input of the predetermined correlation data when said decision means decides that there is the requirement for the predetermined data for comparison and verification included with the received text;

   transfer means for transferring from said operating display to a host device the predetermined correlation data input to said operating display in accordance with the demand of the operating display; and

   control means for controlling a start of printing of said text data on the basis of the correlation result obtained from a host device for the correlation data transferred to the host device by said transfer means.

2. A printing apparatus according to Claim 1, wherein when said decision means decides that a requirement to input the predetermined data for correlation and verification is not included in the text data subsequently received, said control means controls printing so as to preferentially output, to said printer engine, the image data produced on the basis of the text data subsequently received.

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3. A printing apparatus according to Claim 1, wherein said control means controls printing surface face-up output and printing surface face-down output based on the decision of said decision means.

4. A printing apparatus adapted for connection of a plurality of host computers through a network, said printing apparatus comprising:

a printer engine for printing on the basis of image data;

production means for producing image data on the basis of the print data received from any one of said host computers, the print data containing other limiting data;

storage means for storing the image data output from said production means; and

switching means for switching the destinations of the produced image data between said storage means and the printer engine based on the output limiting data contained in print data.

5. A printing apparatus according to Claim 4, wherein said storage means also stores user data for identifying the user; and said printing apparatus further comprises:

input means for inputting predetermined data;

correlation means for correlating the user data stored in said storage means with the data input by said input means; and

control means for controlling a start of transfer of image data to said printer engine from said storage means on the basis of the correlation result obtained by said correlation means.

6. A printing method in a printing apparatus comprising an operating display and a printer engine for printing the image data in accordance with text data sequentially received from a plurality of host computers on a network, said method comprising the steps of:

deciding whether the sequentially received text data includes a requirement to input predetermined data for correlation and verification;

causing the operating display to demand an input of predetermined correlation data when it is decided that there is a requirement for the predetermined data for comparison and verification included with the received text data;

transferring the correlation data input from the operating display to said host computers; and

controlling a start of printing of said text data on the basis of the correlation result obtained from the host computers for the transferred correlation data.

7. A printing method according to Claim 6, wherein when it is decided that a requirement to input the predetermined data for correlation and verification is not included in the text data subsequently received, the image data produced on the basis of the text data subsequently received is preferentially output to said printer engine.

8. A printing method according to Claim 6, wherein printing surface face-up and printing surface face-down output is controlled based on the decision result.

9. A printing method in a printing apparatus adapted for connection to a plurality of host computers through a network, the printing method comprising the steps of:

receiving print data from any one of said host computers; and

switching the destination of the produced image data between a storage device and a printer engine based on output limiting data contained in said print data.

10. A printing method according to Claim 9, wherein the input data is correlated with user data for identifying the user so that transfer a transfer of image data to said printer engine from said storage means is controlled on the basis of the correlation result.

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FIG. 1

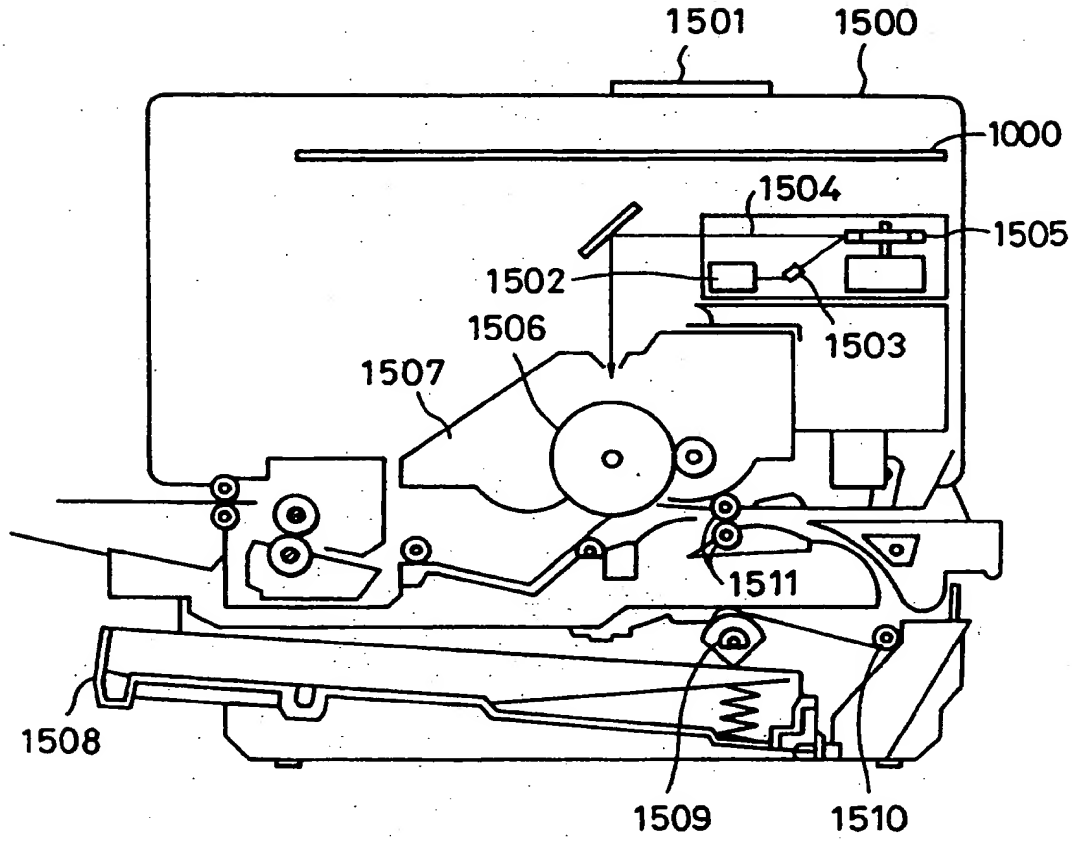

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FIG. 2

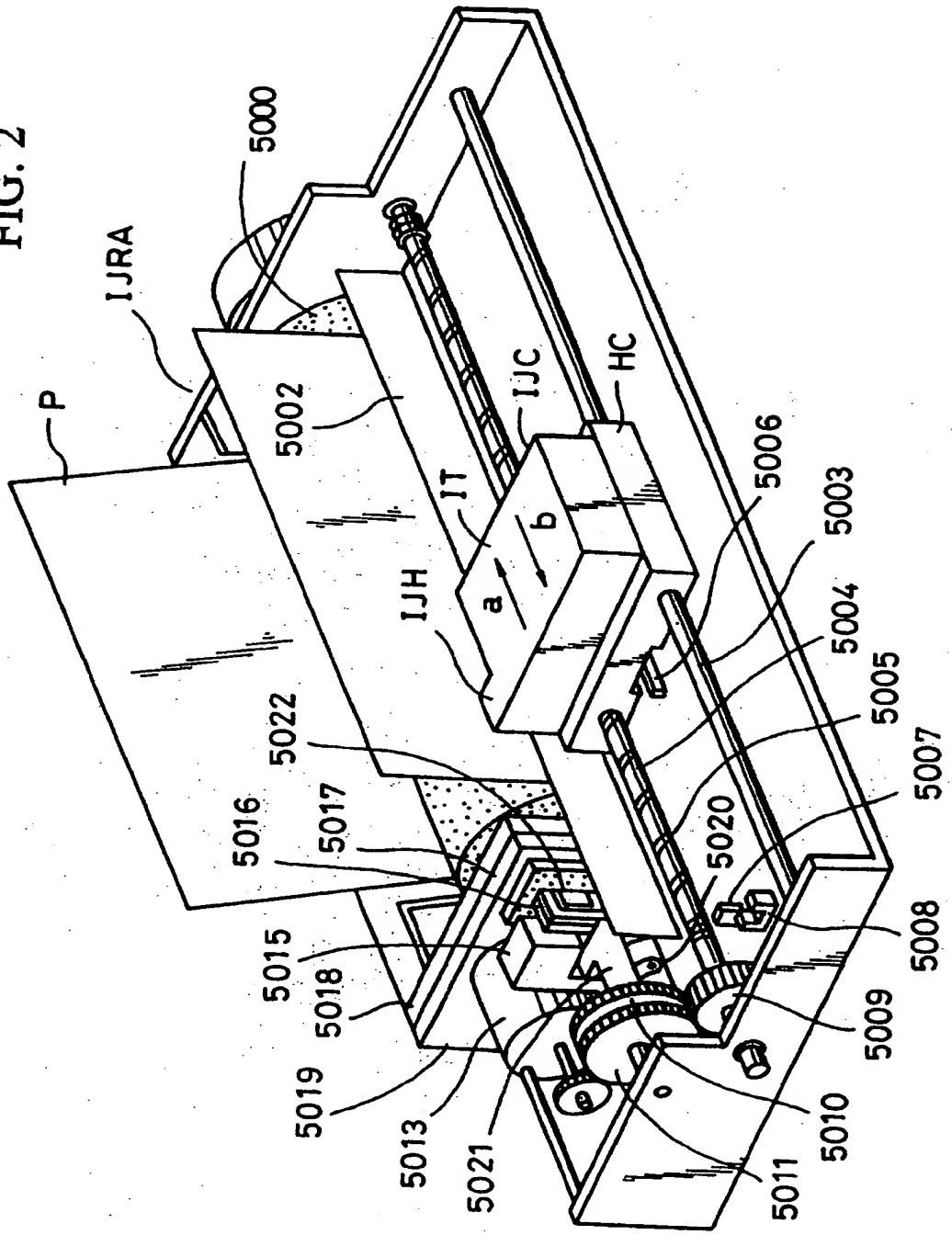

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FIG. 3

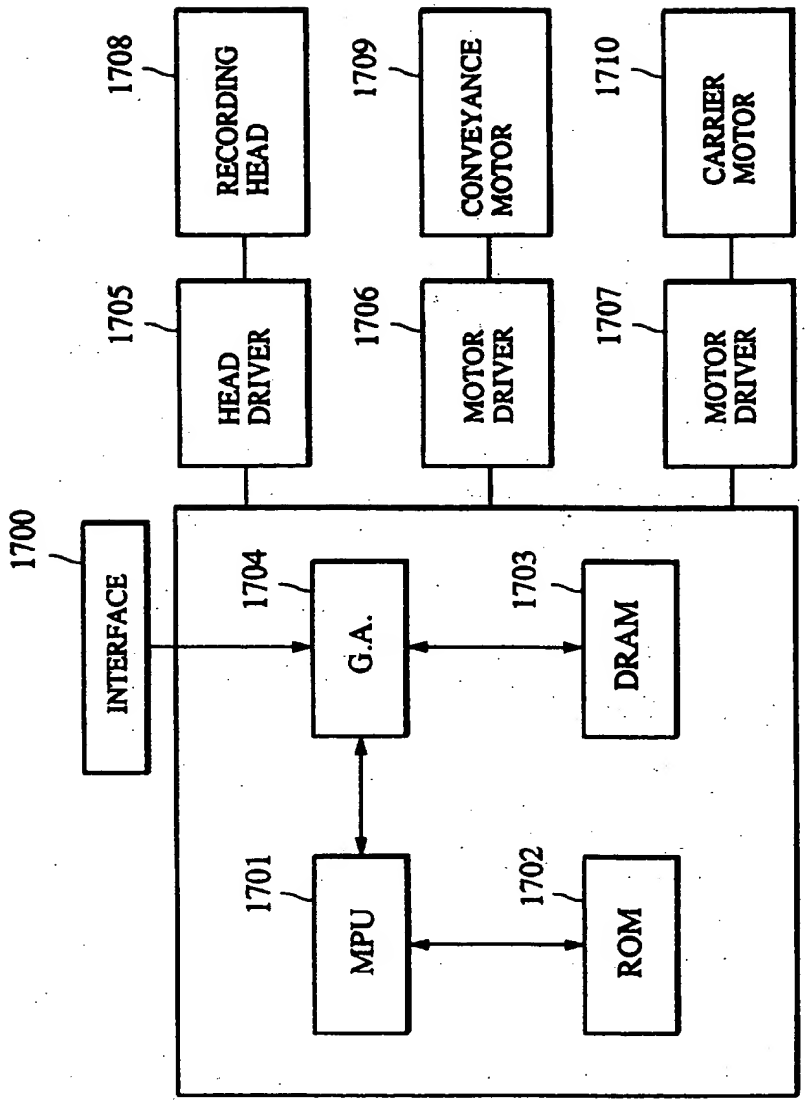

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FIG. 4

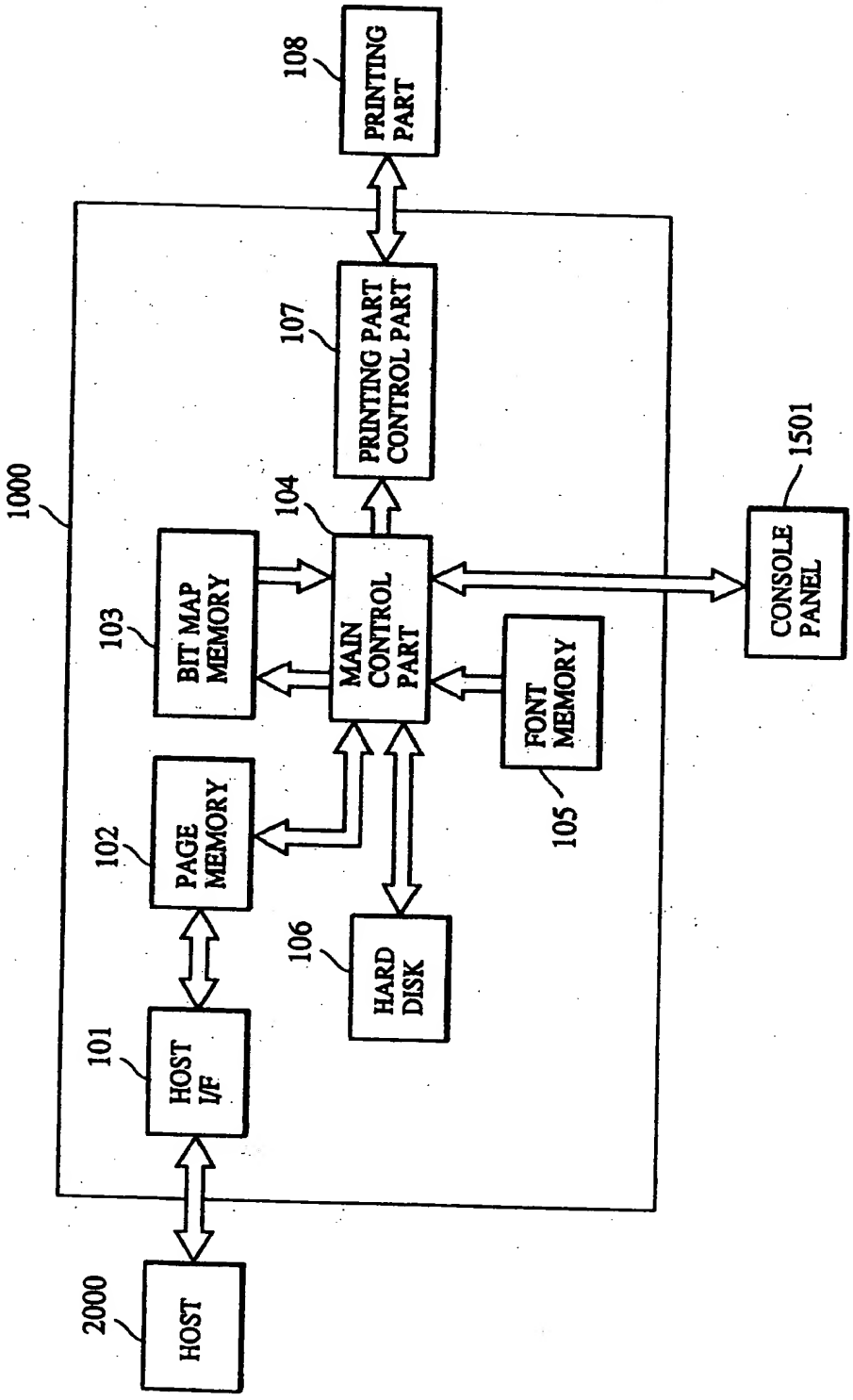
1000
2000
HOST
101
HOST I/F
102
PAGE MEMORY
103
BIT MAP MEMORY
104
MAIN CONTROL PART
105
FONT MEMORY
106
HARD DISK
107
PRINTING PART CONTROL PART
108
PRINTING PART
1501
CONSOLE PANEL

FIG. 5(a)

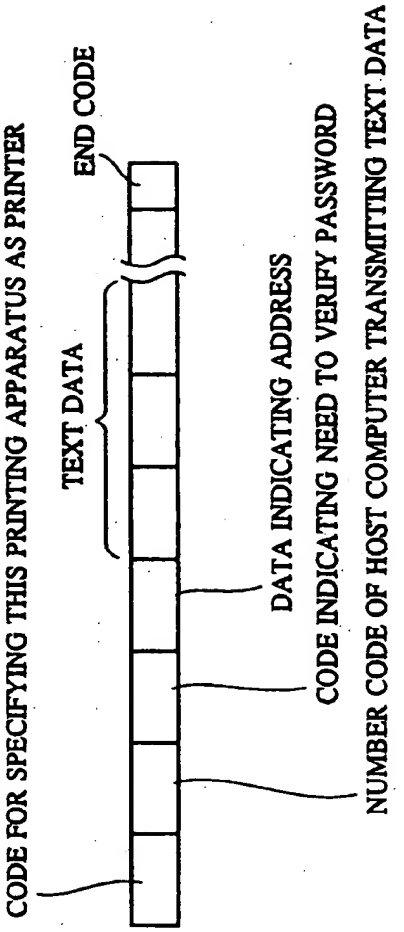

FIG. 5(b)

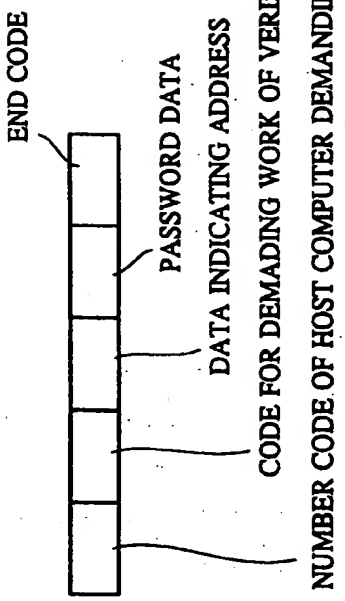

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FIG. 6(a)

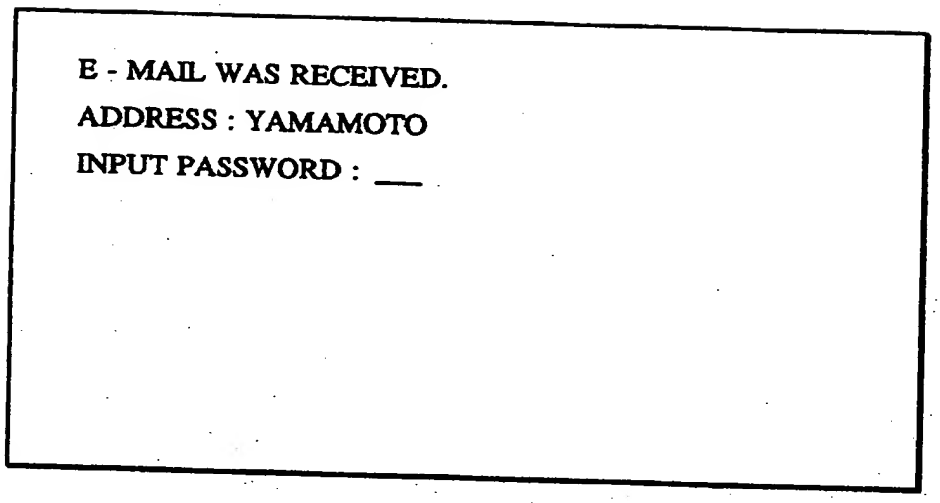
E - MAIL WAS RECEIVED.
ADDRESS : YAMAMOTO
INPUT PASSWORD : ___

FIG. 6(b)

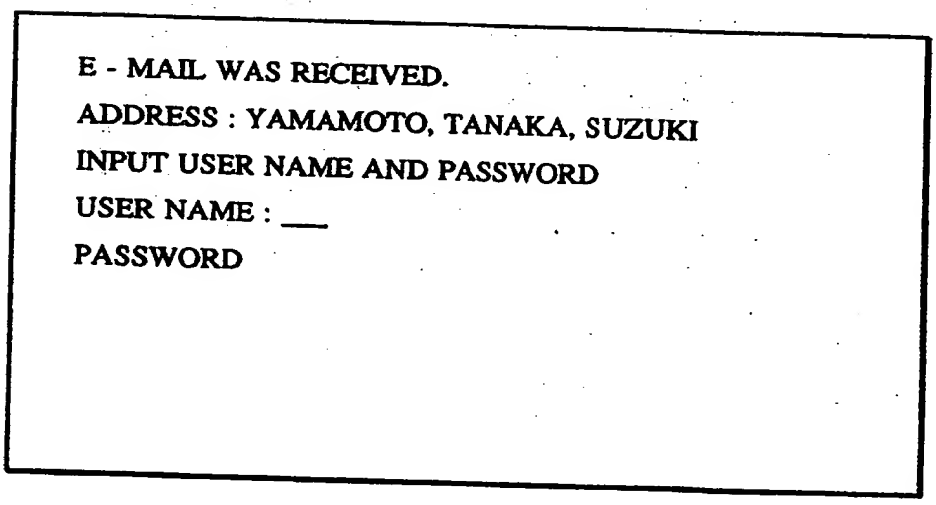
E - MAIL WAS RECEIVED.
ADDRESS : YAMAMOTO, TANAKA, SUZUKI
INPUT USER NAME AND PASSWORD
USER NAME : ___
PASSWORD

FIG. 7

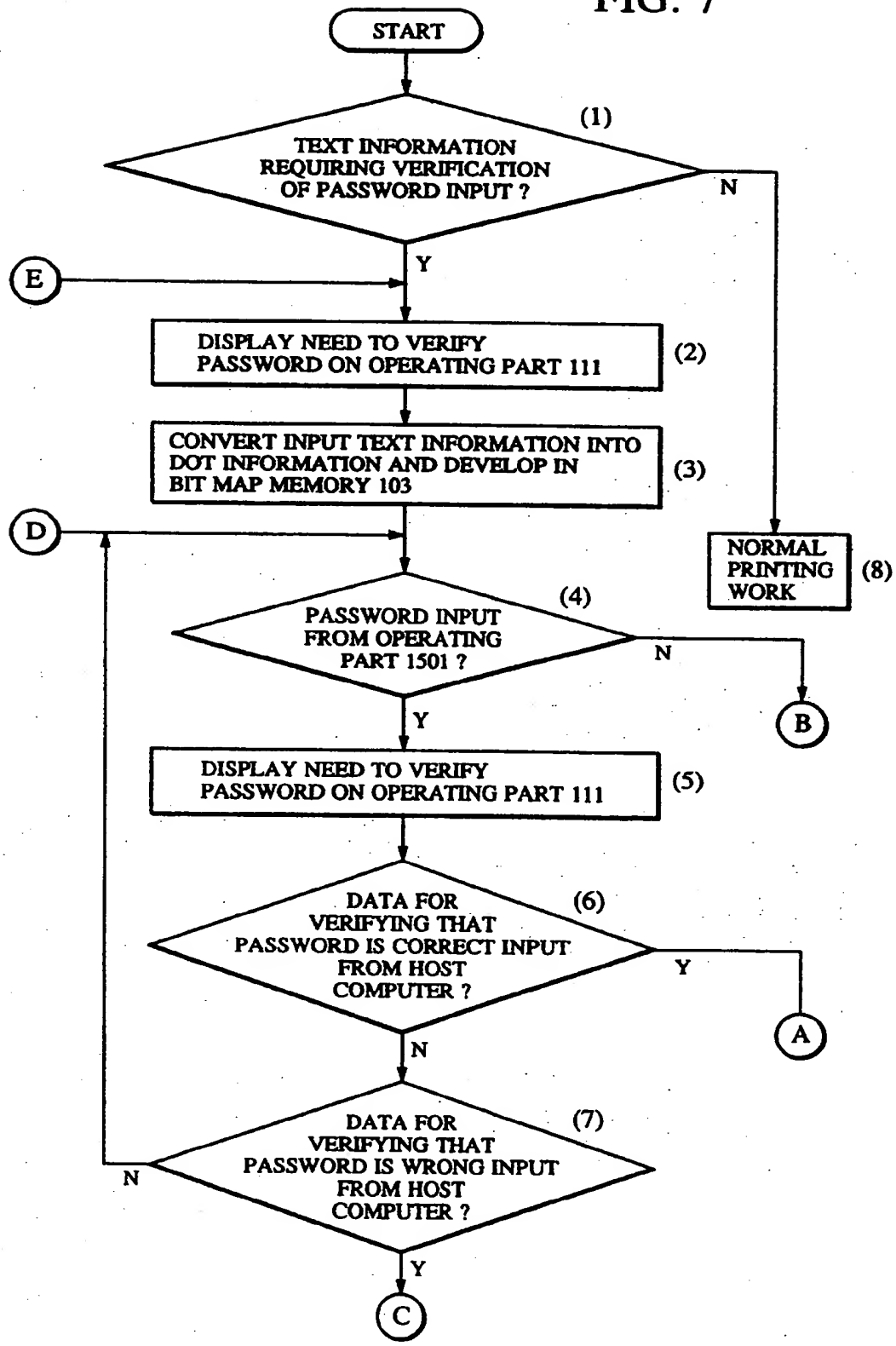
START
(1)
TEXT INFORMATION REQUIRING VERIFICATION OF PASSWORD INPUT ?
N
Y
E
DISPLAY NEED TO VERIFY PASSWORD ON OPERATING PART 111
(2)
CONVERT INPUT TEXT INFORMATION INTO DOT INFORMATION AND DEVELOP IN BIT MAP MEMORY 103
(3)
D
NORMAL PRINTING WORK
(8)
(4)
PASSWORD INPUT FROM OPERATING PART 1501 ?
N
B
Y
DISPLAY NEED TO VERIFY PASSWORD ON OPERATING PART 111
(5)
DATA FOR VERIFYING THAT PASSWORD IS CORRECT INPUT FROM HOST COMPUTER ?
(6)
Y
A
N
DATA FOR VERIFYING THAT PASSWORD IS WRONG INPUT FROM HOST COMPUTER ?
(7)
N
Y
C

FIG. 8(a)

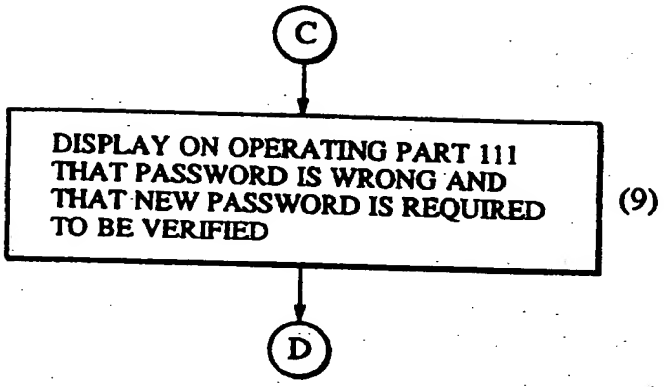
C
DISPLAY ON OPERATING PART 111 THAT PASSWORD IS WRONG AND THAT NEW PASSWORD IS REQUIRED TO BE VERIFIED
(9)
D

FIG. 8(b)

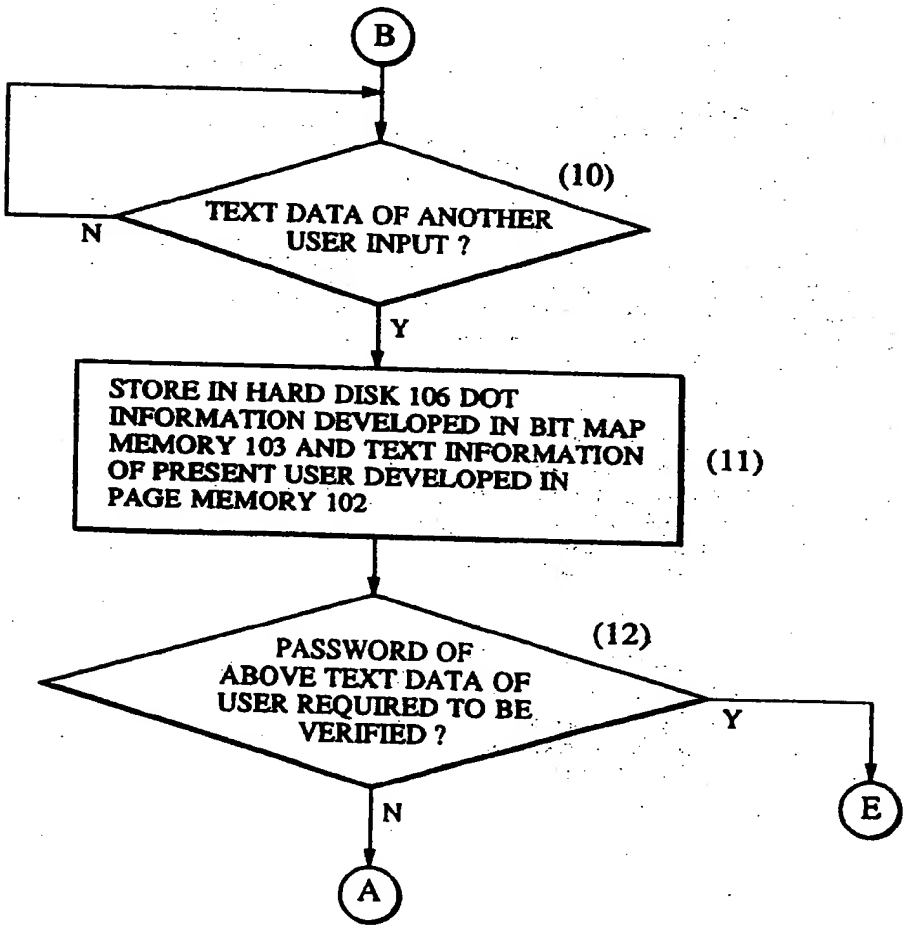
B
(10)
TEXT DATA OF ANOTHER USER INPUT ?
N
Y
STORE IN HARD DISK 106 DOT INFORMATION DEVELOPED IN BIT MAP MEMORY 103 AND TEXT INFORMATION OF PRESENT USER DEVELOPED IN PAGE MEMORY 102
(11)
(12)
PASSWORD OF ABOVE TEXT DATA OF USER REQUIRED TO BE VERIFIED ?
Y
N
E
A

FIG. 9

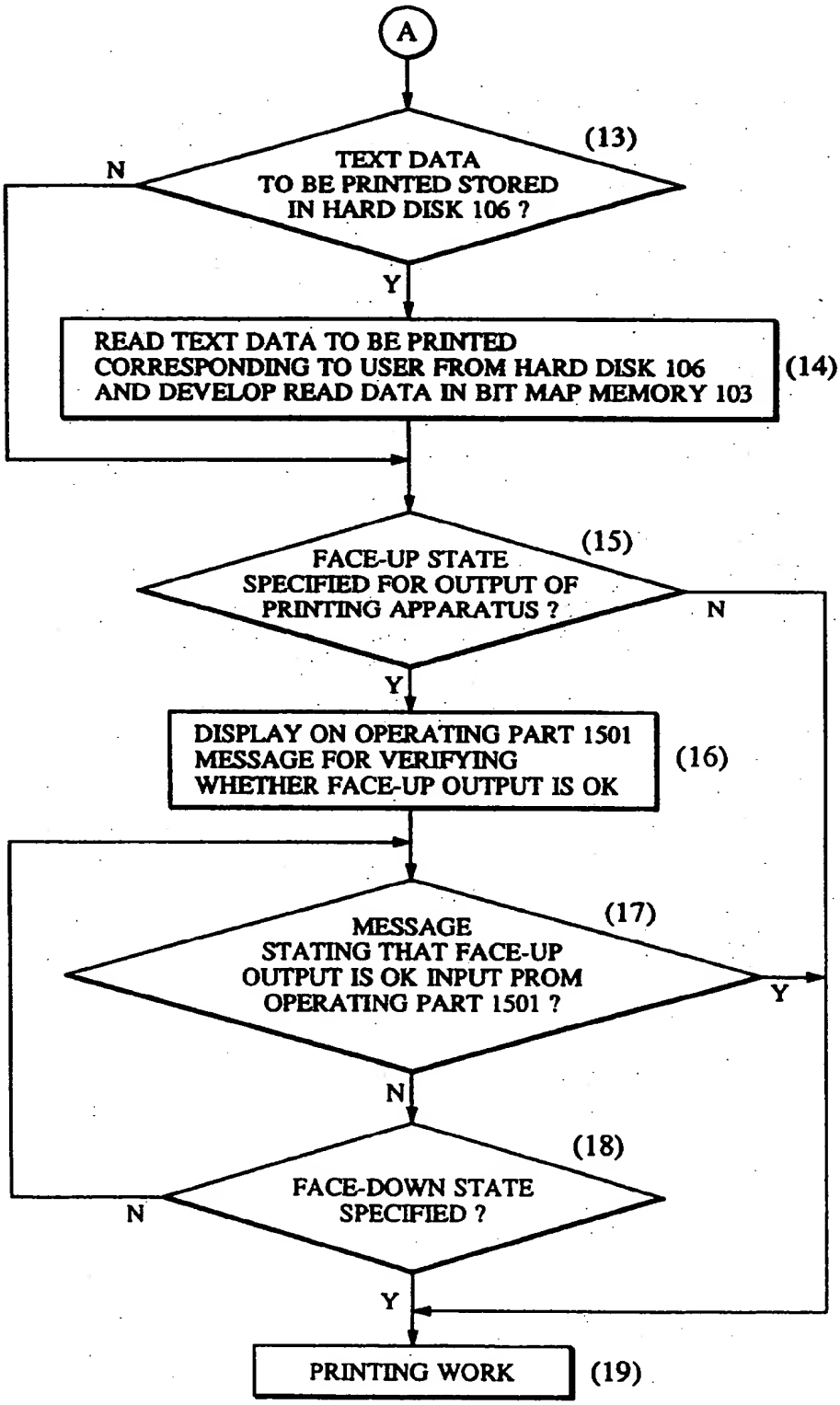

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FIG. 10

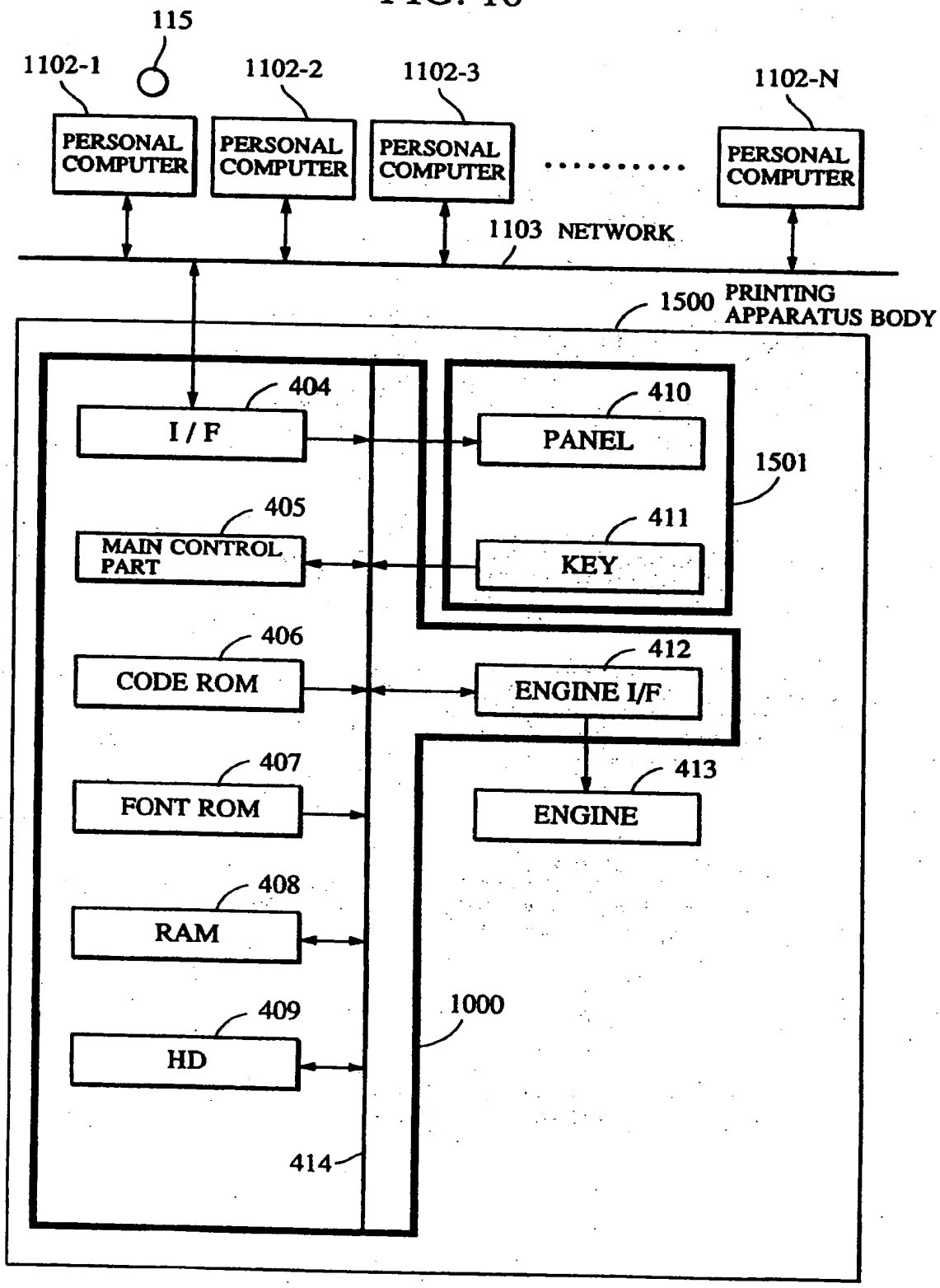

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FIG. 11

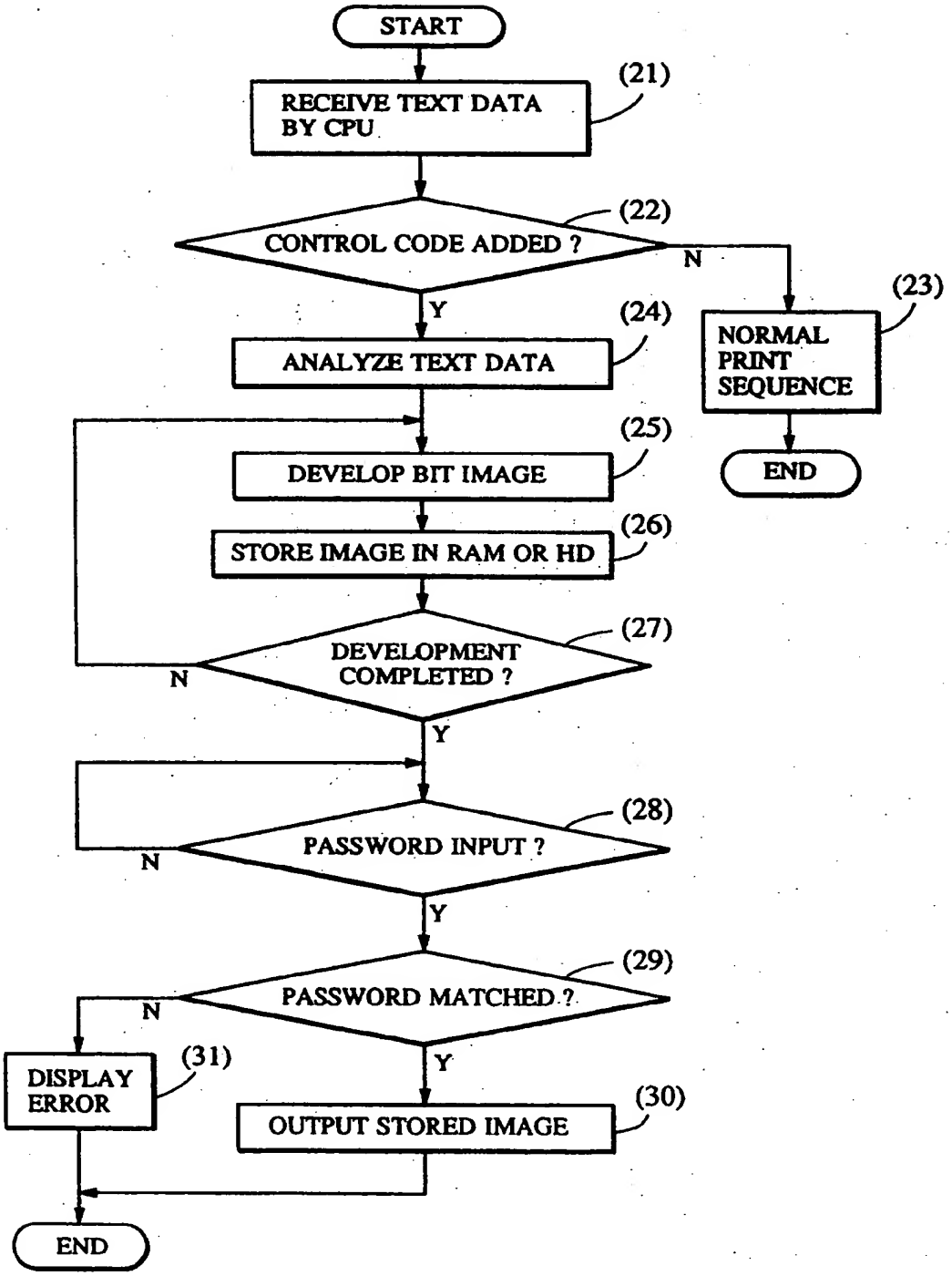

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FIG. 12

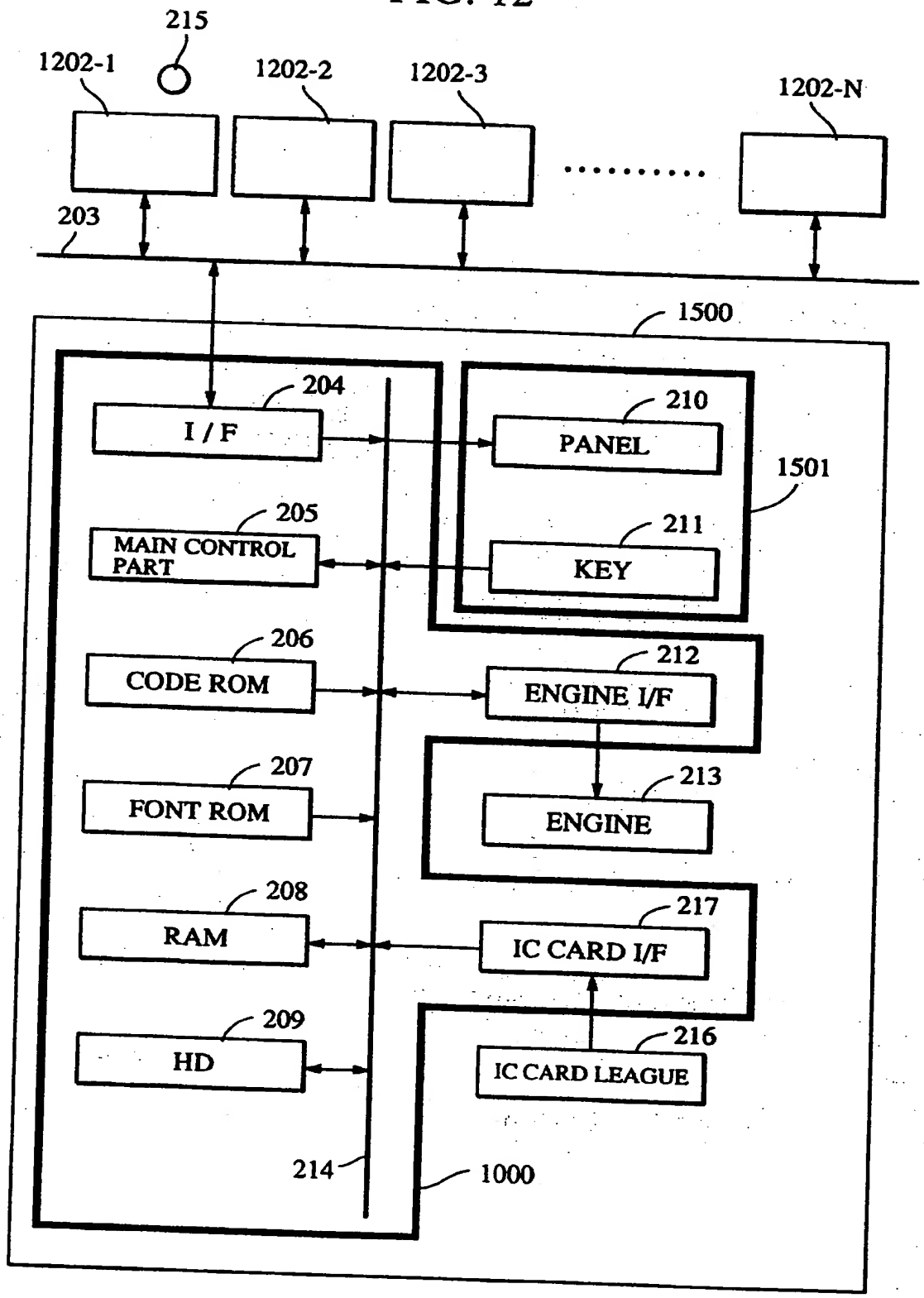
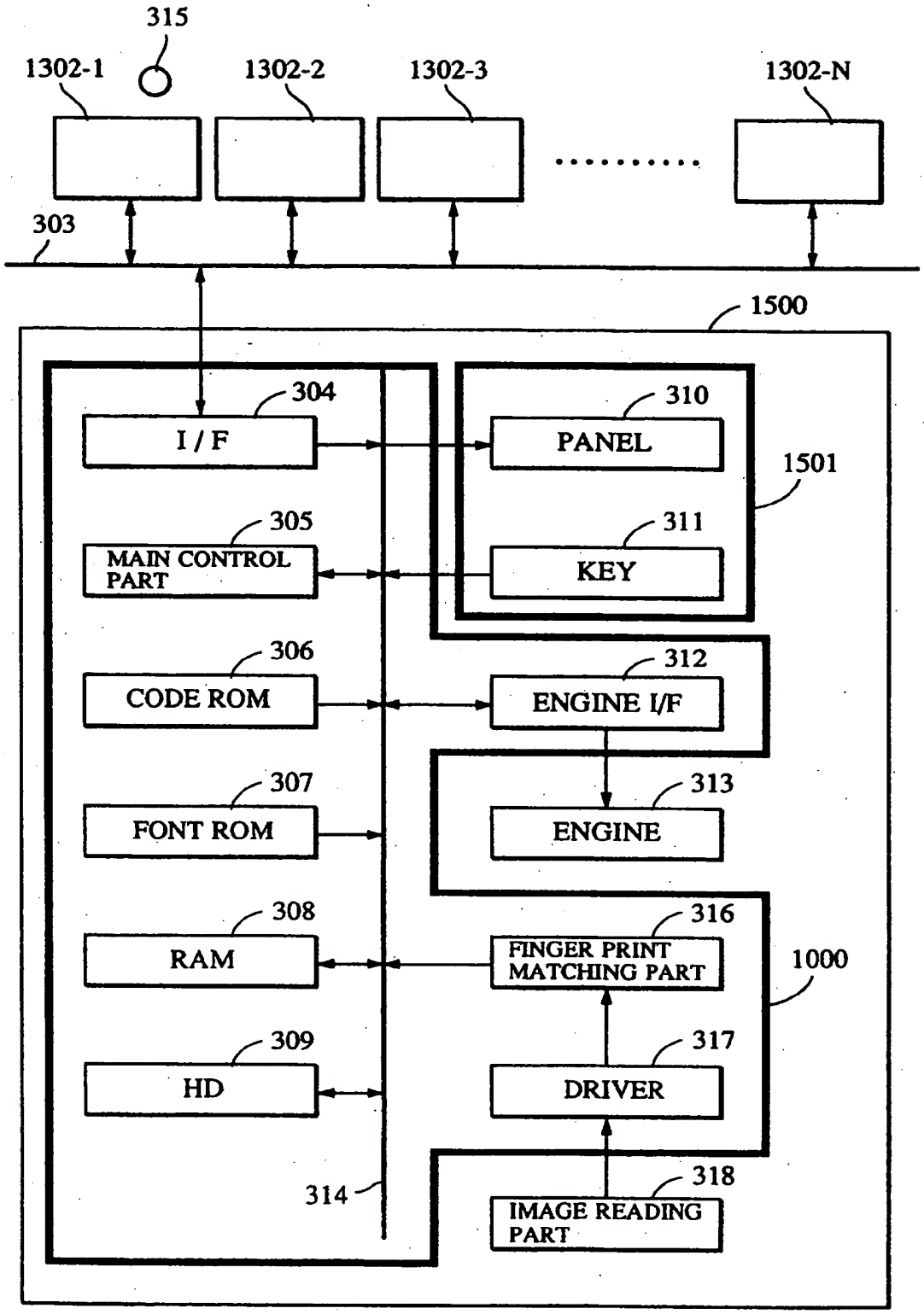

215
1202-1
1202-2
1202-3
1202-N
203
1500
204
I / F
210
PANEL
1501
205
MAIN CONTROL PART
211
KEY
206
CODE ROM
212
ENGINE I/F
207
FONT ROM
213
ENGINE
208
RAM
217
IC CARD I/F
209
HD
216
IC CARD LEAGUE
214
1000

FIG. 13



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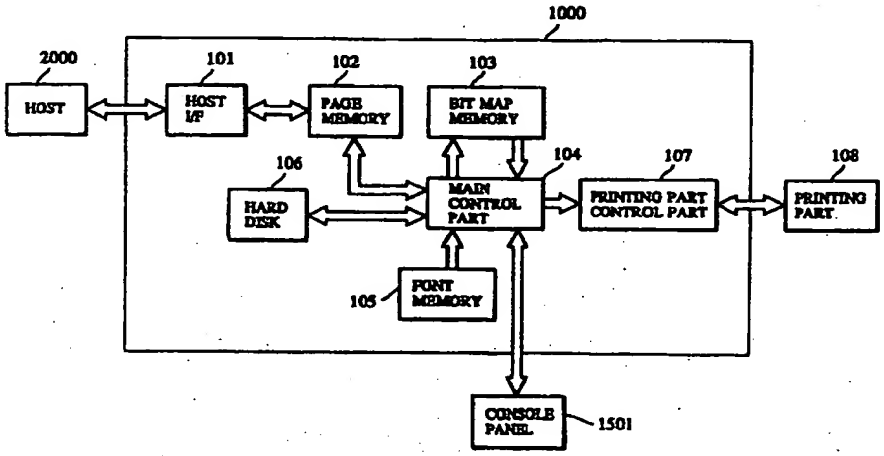
(54) Apparatus and method for printing confidential data

(57) The present invention provides a technique which can protect security of data until a regular user who transmits print data directs to start printing on the side of a printing apparatus even in an environment where a plurality of host computers on a network use a common printing apparatus, and which can print image data which has already been produced, as it is after the user gives instructions to start printing.

FIG. 4



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OCID: <EP___0657845A3_I_>

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EUROPEAN SEARCH REPORT

Application Number
EP 94 11 8765

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	PATENT ABSTRACTS OF JAPAN vol. 016, no. 580 (P-1461), 18 December 1992 & JP 04 227525 A (FUJI XEROX CO LTD), 17 August 1992, * abstract *	1,2,6,7	G06K15/00
X	PATENT ABSTRACTS OF JAPAN vol. 016, no. 286 (P-1376), 25 June 1992 & JP 04 075128 A (FUJI XEROX CO LTD), 10 March 1992, * abstract *	1,3,6,8	
X	PATENT ABSTRACTS OF JAPAN vol. 017, no. 664 (M-1523), 8 December 1993 & JP 05 221089 A (CANON INC), 31 August 1993, * abstract *	1,3,6,8	
A	EP 0 208 342 A (OCE NEDERLAND BV.) 14 January 1987 * column 2, line 7 - line 23 * * column 6, line 15 - line 42 *	1-3,6-8	TECHNICAL FIELDS SEARCHED (Int.Cl.6) G06K B41J
A	DE 36 21 543 A (TOSHIBA KAWASAKI KK) 8 January 1987	1,3,6,8	
A	PATENT ABSTRACTS OF JAPAN vol. 009, no. 281 (P-403), 8 November 1985 & JP 60 122427 A (HITACHI SEISAKUSHO KK), 29 June 1985, * abstract *	1,6	

-/--

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 November 1997	Gélébart, Y

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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D: <EP___0657845A3_I_>

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EUROPEAN SEARCH REPORT

Application Number
EP 94 11 8765

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	PATENT ABSTRACTS OF JAPAN vol. 007, no. 258 (E-211), 17 November 1983 & JP 58 142664 A (FUJITSU KK), 24 August 1983, * abstract * -----	1,4-6,9, 10	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	25 November 1997	Gélébart, Y

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

DCID: <EP___0657845A3_I_>

European Patent Office

Application Number
EP 94 11 8765

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

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(In case of Lack of Unity)

☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

D: <EP___0657845A3_I_>

European Patent Office

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirement of unity of invention and relates to several inventions or groups of inventions, namely:

Subject 1, searched, claims 1,2,6,7: A network printer and printing method for printing confidential data by prompting the printer operator for a password before outputting said data, and where non-confidential data is preferentially directly outputted.

Subject 2, not searched, claims 1,3,6,8: A network printer and printing method for printing confidential data by prompting the printer operator for a password before outputting said data, and where the printed data is outputted face-up or face down depending on its confidentiality.

Subject 3, not searched, claims 4,5,9,10: A network printer and printing method for printing confidential data by prompting the printer operator for a password before outputting said data, where the data is kept in memory in the printer until the correct password is inputted.

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